REMARKS-General

The newly drafted independent claim 13 incorporates all structural limitations of the original claim 1 and includes further limitations previously brought forth in the disclosure. No new matter has been included. All new claims 13 to 30 are submitted to be of sufficient clarity and detail to enable a person of average skill in the art to make and use the instant invention, so as to be pursuant to 35 USC 112.

Response to Rejection of Claims 1-11 under 35USC103

The Examiner rejected claims 1-11 over Chen et al (US 4,175,211) in view of Stankevitch (US2003/0047437 A1) and/or Zhou et al (US 5,744,668). Pursuant to 35 U.S.C. 103:

"(a) A patent may not be obtained thought the invention is **not identically** disclosed or described as set forth in **section 102 of this title**, if the **differences** between the subject matter sought to be patented and the prior art are such that the **subject matter as a whole would have been obvious** at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made."

In view of 35 U.S.C. 103(a), it is apparent that to be qualified as a prior art under 35USC103(a), the prior art must be cited under 35USC102(a)~(g) but the disclosure of the prior art and the invention are not identical and there are one or more differences between the subject matter sought to be patented and the prior art. In addition, such differences between the subject matter sought to be patented **as a whole** and the prior art are obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains.

In other words, the differences between the subject matter sought to be patent as a whole of the instant invention and Chen et al which is qualified as prior art of the instant invention under 35USC102 are obvious in view of Stankevitch and/or Zhou et al at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains.

The applicant respectfully identifies the differences between the claims of the instant invention and Chen et al as follows:

(a) In claim 13, "a process for producing oil product from waste materials including plastic, rubber and machine oil" is claimed, wherein Chen et al merely teaches a process for the conversion of **solid plastic wastes**. In other words, the process taught by Chen et al fails to conversion any liquid waste while the process of the instant invention is adapted to produce the oil product not only from plastic but also from rubber and machine oil. Therefore, the process of Chen et al can only performed to only converse solid plastic wastes. But the process of the instant invention can be performed to converse solid wastes including plastic and rubber and liquid wastes including machine oil.

(b) In claim 13, "mixing waste raw materials with quartz and sand and catalytically cracking a mixture of the waste raw materials, quartz, and sand" is claimed to accelerate a cracking process of the waste raw materials in the cracker, wherein Chen et al merely teaches a process for the conversion of solid plastic wastes. Chen et al does not teach any quartz and sand mixing with the shredded waste plastics in the reactor.

The applicant respectfully submits that mixing the quartz and sand with the waste raw materials is one of the distinctive features of the present invention. In Paragraph 0009, the applicant particularly points out the use of quartz and sand as follows:

"During the process of cracking, the quartz and sand move in parallel at about 100°C, and in curve when the temperature reaches 150°C, then in beeline up and down when the temperature reaches 250°C. The effects of such moving types are: **1. accelerating the cracking; 2. expanding bores in raw materials to get through channels; 3. improving the quality of the oil product by eliminating iron from the feed; 4. reducing coking in the cracker; 5. increasing the yield of oil products; and 6. shortening the production cycle**. In the above effects, the elimination of iron is especially beneficial and has not been solved in the prior art."

However, Chen et al fails to teach and suggest any quartz and sand mixing with the shredded waste plastics. The applicant respectfully submits that there are hundreds of different traditional processes to converse the solid plastic wastes. However, none of the traditional process teaches how to mix the quartz and sand with plastic, rubber and machine oil of the waste materials.

(b) In claim 13, "a cracking temperature initially starting from 50°C to 480°C" is claimed for the cracking process, wherein Chen et al merely discloses (column 2, lines 3-20) the temperatures between 150°F (60°C) and 700°F (371°C) and teaches (column 6, lines 24-26) the reaction conditions includes temperatures above about 850°F (454°C). It is apparent that Chen et al fails to teach the cracking temperature is set initially at 50°C and is increased to 480°C, wherein the temperatures disclosed by Chen et al fails to teach the range of cracking temperature for catalytically cracking the mixture of waste raw materials, quartz, and sand.

(c) In claim 13, "an amount of 0.3 to 1.5% of quartz being added" is claimed into the waste raw materials by a weight ratio between the quartz and the waste raw materials. Chen never teaches any quartz being added into shredded waste plastics and any quantity of quartz required for cracking process.

(d) In claim 13, "an amount of 0.1 to 0.5% of sand being added" is claimed into the waste raw materials by a weight ratio between the sand and the waste raw materials. Chen never teaches any sand being added into shredded waste plastics and any quantity of sand required for cracking process.

(e) Chen et al fails to teach any step of "further catalytically cracking the cracked gas collected from the cracker in a fixed bed to obtain an oil stream". Accordingly, Chen et al is silent regarding any further catalytically cracking process of the gas.

(f) Chen et al fails to teach any step of "fractionating the oil stream to collect fractions of gasoline, kerosene and diesel oil at a fractionating tower". Again, Chen et al is silent regarding any fractionation process of the gasoline fraction.

(g) Chen et al fails to teach any step of "treating fractions of gasoline, kerosene and diesel oil respectively to produce high quality oil product in a relatively

short cycle of production". Chen et al merely teaches the step of distilling the cracked product to recover distillates including a gasoline fraction.

(h) The applicant respectfully submits that the claimed invention must be considered as a whole that the process of the instant invention includes the steps (a) mixing..., (b) further catalytically cracking..., (c) fractionating..., and (d) treating... to produce the high quality oil product in a relatively short cycle of production. However, the process disclosed by Chen et al merely teaches the steps from (a) to (f) which are totally different from the process of the instant invention.

(i) Chen et al fails to teach the cracking temperature is gradually increasing from 50°C to 480°C as claimed in claim 14 in addition to what is claimed in claim 13 as a whole. Chen et al merely suggests the operation temperature but fails to teach the gradually increasing temperature from 50°C to 480°C.

(j) Chen et al fails to teach the cracked gas is further catalytically cracked in an one-step process that only one fixed bed is used as claimed in claims 15 to 16 in addition to what is claimed in claim 13 as a whole.

Examiner alleges that the applicant's admitted prior art regarding the use of fixed bed. The applicant respectfully submits that, in paragraph 0010, "Two fixed beds were adopted and procedures were in two steps, in general, in the prior art. However, a one-step process is adopted in the present invention i.e., there is only one fixed bed in the process. Therefore, the cracked gas being further catalytically cracked in a single fixed bed through a single step process is totally different from the disclosure of the prior arts.

(k) Chen et al fails to suggest the step of frequently adding a mixture of cobaltic phthalocyanin sulfonate, NaOH, and H_2O_2 into said oil stream every 5 to 8 hours, as claimed in claims 17 and 18 in addition to what is claimed in claim 13 as a whole. In particularly, Chen et al fails to teach any mixture containing 200ppm of water solution of cobaltic phthalocyanin sulfonate by dissolving cobaltic phthalocyanin sulfonate in water, 1.5 Kg of 10% NaOH, and 3% of 10% H_2O_2 in responsive to a volume of 10% NaOH.

(l) Chen et al fails to teach the oil stream being fractionated at different temperatures within the fractionating tower as claimed in claims 19 and 20 in addition to

what is claimed in claim 13 as a whole. The applicant respectfully submits that Chen et al does not teach the gasoline is fractionated at a top part of the fractionating tower with a temperature between 195°C to 198°C, the kerosene is fractionated at a middle part of the fractionating tower with a temperature between 200°C to 230°C, and the diesel is fractionated at a bottom part of the fractionating tower with a temperature between 300°C to 360°C.

(m) Chen et al fails to teach how to treat the fraction of gasoline as claimed in claims 21 and 22 in addition to what is claimed in claim 13 as a whole. The applicant respectfully submits that the fraction of gasoline is treated by condensing the fraction of gasoline at a temperature between 160°C to 180°C to form a liquid state and returning the gasoline in liquid state back to the fractionating tower; condensing the fraction of gasoline again in the fractionating tower until the temperature of the gasoline reduces to a range between 30°C to 60°C, followed by a sedimentation to separate oil and water, wherein the oil is then filtered; and treating the oil at a temperature in a range between 30°C to 50°C in an existence of active kaolin in an amount of 1 to 5 % based on a weight of the gasoline. Chen et al is silent regarding such gasoline treatment.

(n) Chen et al fails to teach how to treat the fraction of diesel oil as claimed in claims 23 and 24 in addition to what is claimed in claim 13 as a whole. The applicant respectfully submits that the fraction of diesel is treated by adding 98% H_2SO_4 in an amount of 2 to 5% based on the weight of the fraction of diesel oil to proceed an acid washing; adding 96% NaOH in an amount of 1 to 3% based on the weight of the fraction of diesel oil to proceed an alkali washing; and adding a cetane additive in an amount of 1 to 5% base on the weight of the fraction of diesel oil. Again, Chen et al is silent regarding such diesel treatment.

(o) Chen et al fails to teach the cracking temperature is set from 60°C to 460°C for cracking waste plastics as claimed in claims 25 and 26 in addition to what is claimed in claim 13 as a whole. It is worth mentioning that Chen et al fails to teach the temperature is gradually increasing from 60°C to 460°C for cracking waste plastics.

(p) Chen et al fails to teach the cracking temperature is set from 80°C to 480°C for cracking waste rubbers as claimed in claims 27 and 28 in addition to what is

claimed in claim 13 as a whole. It is worth mentioning that Chen et al fails to teach the temperature is gradually increasing from 80°C to 480°C for cracking waste rubbers.

(q) Chen et al fails to teach the cracking temperature is set from 50°C to 380°C for cracking waste machine oil as claimed in claims 29 and 30 in addition to what is claimed in claim 13 as a whole. It is worth mentioning that Chen et al fails to teach the temperature is gradually increasing from 50°C to 380°C for cracking waste machine oil.

Whether the claims 13 to 30 as amended of the instant invention are obvious depends on whether the above differences (a) to (q) between the instant invention and Chen et al are obvious in view of Stankevitch and/or Zhou et al at the time of the invention was made.

Furthermore, the applicant respectfully submits that when applying 35 USC 103, the following tenets of patent law must be adhered to:

(a) The claimed invention must be considered as a whole;

(b) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;

(c) The references must be viewed without the benefit of hindsight vision afforded by the claimed invention; and

(d) Reasonable expectation of success is the standard with which obviousness is determined.

Also, "The mere fact that a reference could be modified to produce the patented invention would not make the modification obvious unless it is suggested by the prior art." *Libbey-Owens-Ford v. BOC Group*, 4 USPQ 2d 1097, 1103 (DCNJ 1987).

Stankevitch merely teaches a process for the conversion waste plastics to produce hydrocarbon oils without teaching any process for the conversion waste rubber and/or machine oil to product oil product.

In addition, Stankevitch merely teaches grainy inert material, for example, quartz, sand or ceramic crumb, are used for making a fluidized bed and this material

can be used as a circulating heat carrier. However, Stankevitch fails to teach quartz and sand are mixed with the waste raw materials, including plastic, rubber and/or machine oil, in the cracker for catalytically cracking process at the cracking temperature starting from 50°C to 480°C. A mere of recitation from Stankevitch of using grainy inert material for making a fluidized bed does not provide any suggestion of mixing quartz and sand with the waste raw materials in the cracker for catalytically cracking process as taught in the instant invention to provide the effects of: 1. accelerating the cracking; 2. expanding bores in raw materials to get through channels; 3. improving the quality of the oil product by eliminating iron from the feed; 4. reducing coking in the cracker; 5. increasing the yield of oil products; and 6. shortening the production cycle.

On the other hand, Zhou et al merely teaches a process for producing gasoline, diesel and carbon black from a waste material without any mention of any mixing the waste materials with quartz and sand in a cracker for catalytically cracking process. Zhou et al merely teaches "residual sulfur, nitrogen and chlorine being removed through the fixed bed" and "the gaseous substances from the device enter the fixed bed" without any mention of any cracked gas being **further catalytically** cracked in a one-step process that only one said fixed bed is used.

Zhou et al merely teaches the boiling range for gasoline and for diesel without any mention of any step of condensing the fraction of gasoline at a temperature between 160°C to 180°C to form a liquid state and returning the gasoline in liquid state back to the fractionating tower; condensing the fraction of gasoline **again** in the fractionating tower until the temperature of the gasoline reduces to a range between 30°C to 60°C, followed by a sedimentation to separate oil and water, wherein the oil is then filtered; and treating the oil at a temperature in a range between 30°C to 50°C in an existence of active kaolin in an amount of 1 to 5 % based on a weight of the gasoline. Likewise, Zhou et al fails to teach that fraction of diesel oil is treated through acid washing, alkali washing and addition of cetane additive.

A mere recitation of Zhou et al of "the products of catalytic cracking from the device are introduced into a condenser in which they are cooled to room temperature" does not teach how to fractionate the oil stream at different temperatures within the fractionating tower. The applicant respectfully submits that Zhou et al does not teach the gasoline is fractionated at a top part of the fractionating tower with a temperature

between 195°C to 198°C, the kerosene is fractionated at a middle part of the fractionating tower with a temperature between 200°C to 230°C, and the diesel is fractionated at a bottom part of the fractionating tower with a temperature between 300°C to 360°C. In other words, the gasoline, kerosene, and diesel are fractionated at different parts of the fractionating tower at different temperatures but not by cooling the steam at the room temperature.

"To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited art references for combination in the manner claimed... [T]he suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness..." *In re Gorman*, 933 F.2d 982, 986, 18 USPQ 2d 1885, 1888 (Fed. Cir. 1991).

Accordingly, the applicant believes that neither Chen et al, Stankevitch nor Zhou et al, separately or in combination, suggests or makes any mention whatsoever of the difference subject features (a) to (q) as claimed in the amended claims 13 to 30 of the instant invention.

Applicant believes that for all of the foregoing reasons, all of the claims are in condition for allowance and such action is respectfully requested.

The Cited but Non-Applied References

The cited but not relied upon references have been studied and are greatly appreciated, but are deemed to be less relevant than the relied upon references.

In view of the above, it is submitted that the claims are in condition for allowance. Reconsideration and withdrawal of the rejection are requested. Allowance of claims 13 to 30 at an early date is solicited.

Should the Examiner believe that anything further is needed in order to place the application in condition for allowance, he is requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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